

We claim:

1. A system which is suitable as a catalyst for the hydrocyanation of olefinically unsaturated compounds and comprises

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- a) Ni(0)
- b) a compound which complexes Ni(0) as a ligand and contains trivalent phosphorus,
- 10 c) a Lewis acid

and

15 d) a compound of the formula M R_n

where

M: Al or Ti

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R: identical or different monovalent alkoxy radicals, in which case a plurality of alkoxy radicals may be bonded together, and additionally, in the case that M = Al, R may be identical or different monovalent alkyl radicals, in which case a plurality of alkyl radicals may be bonded together or one or more alkyl radicals may be bonded to one or more of the abovementioned alkoxy radicals,

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n: valency of M.

30 2. A system as claimed in claim 1, wherein R, in the case of an alkoxy radical, is methoxy, ethoxy, 1-propoxy, 2-propoxy, 1-n-butoxy, 2-n-butoxy, 1-isobutoxy or 2-isobutoxy.

3. A system as claimed in claim 1, wherein R, in the case of an alkyl radical, is methyl, ethyl, 1-propyl, 2-propyl, 1-n-butyl, 2-n-butyl, 1-isobutyl or 2-isobutyl.

35 4. A system as claimed in claim 1 or 2, wherein compound d) is a titanium tetraalkoxide.

5. A system as claimed in claim 1 or 2, wherein compound d) is an aluminum tri-alkoxide.
6. A system as claimed in claim 1 or 3, wherein compound d) is a trialkylaluminum.
- 5 7. A system as claimed in any of claims 1 to 6, wherein the R radicals in compound d) are the same.
- 10 8. A process for hydrocyanating an olefinically unsaturated compound in the presence of an Ni(0)-containing catalyst system, which comprises using a system as claimed in any of claims 1 to 7 as the Ni(0)-containing catalyst system.
- 15 9. A process as claimed in claim 8, wherein the olefinically unsaturated compound contains a functional group selected from the group consisting of -CN, -COOR¹, -CONR²R³

where R¹, R², R³: each independently, in the case that R² and R³ are the same or different, H or alkyl.

- 20 10. A process as claimed in claim 8, wherein the olefinically unsaturated compound used is a compound of the formula (C₄H₇)-X
where X: functional group selected from the group consisting of -CN, -COOR¹, -CONR²R³
- 25 where R¹, R², R³: each independently, in the case that R² and R³ are the same or different, H or alkyl.
11. A process as claimed in claim 8, wherein the olefinically unsaturated compound used is a linear pentenenitrile.
- 30 12. A process as claimed in claim 8, wherein the olefinically unsaturated compound used is 3-pentenenitrile or 4-pentenenitrile.